



Economic Liberalization & Rural Land and Labour Markets in India: A Study

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Abstract

The paper examines the rural land and labour markets in the context of economic liberalization in India. Land and labour are the two fundamental resources available to the rural people for income generation. The access to land and to employment for labour become basic determinants of well-being for the rural households. Reforms are often seen as hostile to rural areas and the poor, although they should be beneficial not only for overall growth, but also rural growth and poverty alleviation. The study based on primary household data examines the land and labour markets in the reform period and the underlying linkages of these to different characteristics of the household. The study finds that over the reform period in India the land markets are leading to less landlessness rather than more, and growth in marginal and medium farm sizes rather than large. Lease markets are leading to operated land in more hands. Land purchase behaviour is related to less land, more education, greater crop diversification, and higher crop and livestock revenues. Leasing-in is also related to many of the same variables and is showing great diversity in lease agreements involving outputs, inputs and rent. Labour-employment is showing diversity of occupations but the primary dependence on agriculture is still about 80 percent. There has been some change in the occupational structure. Non-farm employment is associated with higher overall employment. Own-farm employment is strongly related to crop diversification and livestock activity; other farm employment to number of male and female family members and irrigation; and non-farm employment to education. Broadly, liberalization does not show adverse consequences but rather some positive impact on rural land and labour markets.

Introduction

India initiated decisive economic reforms in mid-1991, making a break away from a strongly inward-oriented policy regime, towards creating a liberal environment for an efficient competitive economy and better trade performance. The new policy regime was designed to strike at the main cause of India's high-cost low-quality economic structure (Ahluwalia and Little 1998). Industrial licensing requirements were drastically rolled back to give private sector a free hand. Import licensing was done away with for most goods except consumer goods, and duty rates were cut so that by 1996 the import-weighted tariff had declined to 27 percent from the pre-reform level of 87 percent in 1991. The exchange rate was devalued by about 20 percent. The initial response to the reforms was quite encouraging including faster growth, good export performance, and better

¹ Contributed paper presented at the Conference of the International Association of Agricultural Economists, Gold Coast, Australia, August 12-18, 2006. Copyright 2006 by Vasant P. Gandhi. All rights reserved. Readers may make verbatim copies of this document for non-commercial purposes by any means, provided that this copyright notice appears on all such copies. Contact: gandhi@iimahd.ernet.in

financing of imports through export earnings, leading reformers to argue for faster liberalization. Constraints from infrastructure bottlenecks, resistance from vested interests, and need for strong political will/ support in a democratic framework, created some difficulties.

Frequently, reforms are considered hostile to the poor. Reforms should be designed to be good not only for overall growth, but also for labour-intensive and rural growth on which poverty alleviation depends. It was believed that liberalization of the economy should help agriculture and would have the potential for raising rural output, wages, and employment. Apart from within the agricultural sector per se, a large part of this impact may come through demand from the liberalization of the non-agricultural sector. Pre-condition for the realization of this potential were the institutional and supply side factors in agriculture. If there were severe supply and institutional bottlenecks, especially in land, water, modern inputs, rural credit and marketing, then the likely beneficial impact of liberalization on agriculture would be subdued.

Land and labour are two basic factors available with the rural people for income generation, apart from capital. The access to land and generation of employment would be basic determinants of income and well-being for the rural households. Even the access to and accumulation of capital by rural households would depend on these two fundamental factors. Whereas different studies on land and labour/ employment are available for India (such as Adhikari 2000, Rajuladevi 2000, Sen, 1996, Vaidyanathan, 2000, Gandhi 1997 and Mani & Gandhi 1994), few studies have examined the impact of liberalization on rural land and labour markets over the reform period and the linkages of these to the households and their characteristics. This study seeks to examine the patterns and transformations in these since the reforms, and identify some of the determinants of this transformation, based on primary data collected in the state of Gujarat in western India.

Data and Background

Gujarat state has a population of about 51 million (2001 Census), of which 63 percent is rural. The economy of Gujarat state is embedded in the Indian economy and is strongly influenced by policies made in New Delhi (Center). It is considered a progressive state in India, and its per capita income is slightly above the national average. With comparatively poor rainfall and natural endowments but relatively good administration and infrastructure, it has seen some significant effects of the reforms and has been among the top three states in industrial investment. Agriculture is important in Gujarat and is highly diversified. The relatively poor rainfall and natural endowments makes it a food-deficit state with several areas and populations facing poverty and food-security problems in different parts of the year. A significant feature of Gujarat

is its rich variety of local institutions including a strong co-operative movement and a large number of NGOs as well as informal groups. These features make it a relevant state to study the impact of reforms on the households.

The data for the study is derived from a stratified random sample of 120 households spread over two representative and diverse districts in the state of Gujarat. The data was collected under an FAO funded study focusing on rural income generation, poverty alleviation and local institutions. The survey year was 1997/98 (with recall for 1990/91). Of the four villages randomly sampled, two are from the northern Banaskantha district, having a semi-arid to arid environment, and two are from south-central Kheda district, having a sub-humid environment with irrigation. One village in each district is small and one large in terms of population.

Land Markets

Land is clearly a scarce resource in the state of Gujarat, as is evident from a population density of 211 persons per sq. km. What have been the changes in the distribution of land holding over the period of economic reforms? Table-1 shows the changes that have taken place between 1990/91 and 1997/98. The table shows that the percentage of landless households has actually reduced

Table-1 : Distribution of Households on Land				
<i>Status</i>	<i>On Owned Land</i>		<i>On Operated Land</i>	
	<i>1990/91</i>	<i>1997/98</i>	<i>1990/91</i>	<i>1997/98</i>
	<i>(Percentage)</i>			
No Land	37.5	35.8	41.7	38.3
Marginal (>0 to 2.5 acres)	27.5	30.0	25.0	29.2
Small (2.5 to 5.00 acres)	18.3	16.7	15.8	15.0
Medium (5.01 to 10.00 acres)	13.4	15.0	14.2	15.0
Large (Above 10 acres)	3.3	2.5	3.3	2.5
All	100.0	100.0	100.0	100.0

from 37.5 percent to 35.8 percent across these years for owned land, and even for operated land the percentage has reduced from 41.7 to 38.3. This indicates a positive change in both land ownership and operated land - there is no major trend towards dispossession of land. Whereas the number of marginal farmers has increased to about 30 percent, the number of small farmers has reduced to about 15-16 percent and the number of medium farmers has risen to about 15 percent. The number of large farmers has reduced from 3.3 to 2.5 percent. Thus, the data does not indicate a shift towards large farm sizes. The main trend seems to be of bi-polar increase towards marginal farms (>0 to 2.5 acres) and medium farms (5 to 10 acres).

Table-2 gives the average land holding sizes and shows an average landholding of 2.6 acres, which is a small decline from 2.71 acres in 1990/91. Whereas the amount of leased-in as well as leased-out land shows significant increases, the amount of land in the lease market does not appear to be very large (about 10 percent). The amount and percentage of irrigated land also shows a small increase.

Table-2 : Land: Average Size - Holding and Leasing (Acres)		
<i>Particulars</i>	<i>1990/91</i>	<i>1997-98</i>
Land	2.71	2.68
Leased in Land	0.09	0.16
Leased out Land	0.19	0.26
Total Operating Land	2.61	2.58
Irrigated Land	1.82	1.87
Irrigated land leased in	0.08	0.09
Irrigated land leased out	0.08	0.12
Total irrigated land	1.82	1.85

Table-3 : Distribution of households on the basis of Change in Land					
					<i>(Percentage)</i>
<i>Status</i>	<i>Change in Land (acres)</i>	<i>Land owned</i>	<i>Land leased in</i>	<i>Land leased out</i>	<i>Operating land</i>
Increase	0.1-2.5	-	4.2	1.7	2.5
	2.5-5.0	-	1.7	0.8	1.7
	>5	2.5	-	-	2.5
	No change	92.5	93.3	97.5	85.8
Decrease	>5	1.7	-	-	1.6
	2.5-5.0	1.6	0.8	-	3.4
	0.1-2.5	1.7	-	-	2.5

Table-3 brings out the magnitudes and distribution of the observed changes in land holding and leasing. The table shows that in the increase of land owned, small transactions are not there, but only large changes of more than 5 acres. On the other hand in the decreases the magnitudes range from 0.1 to more than 5 acres. However, 92.5 percent of the households show no change in land owned. Changes in operated land are more frequent, but there is evidence of both increases and decreases. Leasing-in is more common than leasing-out. But the transactions are usually of small magnitude ranging from 0.1 to 5 acres. Table-4 shows that in the majority of cases land has been acquired before many years. Only in 1.6 percent of the households has land been acquired within the last 3 years, and in 5 percent of the cases between 4 to 10 years ago. Thus, there is some but not substantial land transaction activity since reforms.

Table-5 shows that 84 percent of the households do not participate at all in the lease market. 7.5 percent are engaged in leasing-in and 9.2 percent in leasing-out. The table also shows that participation in the lease market has increased considerably over the reform period from 2.5 percent to 7.5 percent for lease-in, and 5.8 to 9.2 percent for lease-out. Table-6 shows that both leasing-in and leasing-out are most common in households owning land, irrigation as well as livestock. Some leasing-in is also shown by the landless/very marginal, but not leasing-out. In the

Table-4 : Land Acquisition	
	Percentage
Not applicable	35.8
Before many years	57.5
About two years	0.8
About three years	0.8
About four & five years	2.5
About 10 years	2.5

Table -5 : Leased-in and Leased-out Land Holdings (Percent)				
	Leased in		Leased out	
	1990/91	1997/98	1990/91	1997/98
No	97.5	92.5	94.2	90.8
Yes	2.5	7.5	5.8	9.2
Leased-in/Leased-out				
Leased in	Leased out		Total	
	No	Yes		
No	84.2	8.3		
Yes	6.7	0.8	7.5	
Total		9.2		

Table-6: Frequency Distribution of Lease-in and Lease-out		
	Lease-in	Lease-out
By Group (percentage)		
Land+Irrigation+Livestock	33.3	40.0
Land+Irrigation+No Livestock	0	20.0
Land +Unirrigated+Livestock	33.3	20.0
Land +Unirrigated+No Livestock	0	10.0
Landless/Very Marginal	33.3	10.0
Service Class	0	0
Duration of Lease-in (percentage)		
Kharif Season	33.3	45.5
Rabi Season	22.2	0
Summer Season	0	9.1
Whole year	44.4	45.5

most cases the leasing is seasonal for either the *kharif* (monsoon), *rabi* (winter) or summer seasons. However, 45 percent of the leasing is for the whole year. Table-7 shows that leasing-in is

always on the basis of sharing of the product, and the most common sharing proportion is 50 percent. On the other hand leasing-out, (which would include to outsiders) involves rent in cash in 45 percent of the cases with a range of different amount. In the remaining cases, sharing of products ranging from 33 to 66 percent is observed. Table-8 shows that sharing of inputs is also becoming quite common. This includes the sharing of seeds in about 50 percent of the cases, sharing of tractor in 20 to 30 percent of the cases, sharing of fertilizers in 40 to 65 percent of the cases, and of irrigation in 20 to 30 percent of the cases. Thus, a large variety of leasing arrangements are shown.

Table-7: Rent & Sharing Arrangements		
	<i>Lease-in %</i>	<i>Lease-out %</i>
Rent in Cash		
Nil	100.0	45.0
Rs.250	0	9.1
Rs.500	0	18.2
Rs.800	0	9.1
Rs.1500	0	9.1
Rs.4000	0	9.1
Sharing of Products		
Nil	0	54.5
25%	11.1	0
33%	22.2	18.2
50%	44.4	18.2
66%	11.1	9.1
75%	11.1	0

What are the determinants of household behaviour in the buying and selling of land, and the leasing-in and leasing-out of land? This is examined through the following model:

$$y_i = f(x_1, x_2, x_3, x_4, x_5, x_6, x_7, x_8)$$

Where:

- y_i = (1) Land buying/purchase (2) Land sale (3) Land leased in (4) Land leased out.
 x_1 = Land owned
 x_2 = Irrigated land owned
 x_3 = Total number of family members
 x_4 = Education
 x_5 = Age
 x_6 = Number of crops (indicating cropping intensity and crop diversification)
 x_7 = Crop revenue
 x_8 = Livestock revenue
 (see Appendix for details of variable definitions)

This is estimated through TOBIT regression analysis and the results are given in Table-9.

A TOBIT model is preferred because of the large number of zero values and the truncation at

Table-8 : Sharing of Inputs					
	(Percent)				
	Nil	33%	50%	66%	100%
% Sharing of Seed					
Leased in	44.4	11.1	22.2	11.1	11.1
Leased out	54.5	18.2	9.1	0	18.2
% Sharing of Tractor					
Leased in	77.8	0	11.1	-	11.1
Leased out	72.7	9.1	9.1	-	9.1
% Sharing of Bullocks					
Leased in	77.8	0	11.1	0	11.1
Leased out	100.0	0	0	0	0
% Sharing of Pesticide					
Leased in	77.8	0	11.1	11.1	0
Leased out	81.8	0	9.1	0	9.1
% Sharing of Fertilizer					
Leased in	33.3	11.1	44.4	11.1	0
Leased out	54.5	18.2	9.1	0	18.2
% Sharing of Irrigation					
Leased in	66.7	0	22.2	11.1	0
Leased out	81.8	0	9.1	0	9.1
% Sharing of Hired Labour					
Leased in	100.0	0	0	0	0
Leased out	90.9	0	0	0	9.1
% Sharing of Other Inputs					
Leased in	100.0	0	0	0	0
Leased out	90.9	0	0	9.1	0

Table-9 : TOBIT Regression Results for Land								
Variables	Land – Purchase				Land - Sale			
	Coeff.	t-Stat.	Signf.	Level	Coeff.	t-Stat.	Signf.	Level
x1	-1.8829	-5.712	0.0000	***	1.4965	2.558	0.01054	**
x2	-0.40568	-0.904	0.36625		0.24486	0.355	0.72271	
x3	-0.98193	-5.483	0.0000	***	-0.26437	-0.549	0.58310	
x4	0.83468	10.197	0.0000	***	-0.13883	-0.207	0.83597	
x5	-0.24680	-15.483	0.0000	***	-0.17431	-2.006	0.04480	**
x6	5.2393	17.391	0.0000	***	0.70119	-0.655	0.51223	
x7	0.19197	6.104	0.0000	***	-0.21555	-1.543	0.12280	
x8	-0.64949	-2.337	0.01942	**	0.28007	0.194	0.84630	
Variables	Leasing-in Land				Leasing-out Land			
	Coeff.	t-Stat.	Signf.	Level	Coeff.	t-Stat.	Signf.	Level
x1	-0.12649	-0.317	0.75118		0.39220	5.574	0.0000	***
x2	-0.82730	-1.286	0.19828		-0.31752	-0.312	0.75502	
x3	-0.58845	-1.926	0.05414	*	-0.44290	-0.138	0.89051	
x4	0.95062	-1.564	0.11793		-0.28215	-0.674	0.50052	
x5	-0.80739	-1.680	0.09293	*	0.56445	1.093	0.27447	
x6	2.6798	2.923	0.00346	**	0.31477	-4.372	0.00001	***
x7	-0.52909	-0.974	0.32994		0.31192	-4.189	0.00003	***
x8	0.15331	1.975	0.04822	**	0.10474	1.061	0.28892	
Note: Significance: *** at 99%; ** at 95%; and * at 90%.								
Variable definitions details are at the end of the paper.								

zero of the dependent variable. The variable definitions details are given in the appendix. The buying equation shows a negative relationship of buying with land holding indicating that those who have more land are unlikely to buy more but those who have less are likely to buy. It is also negatively related to age indicating that younger farmers are likely to buy rather than older farmers. It is also negatively related to family size and livestock revenue. On the other hand there is a positive relationship with education. The relationship is also positive with number of crops and crop revenue indicating positive association with cropping intensity/diversity and crop income. The land selling equation shows a negative relationship with age indicating that those of more advanced age are less likely to sell. It shows a positive relationship with the amount of land indicating that those having more land are more likely to sell.

The leasing-in equation indicates a positive relationship with the number of crops and livestock revenue showing more leasing in with crop and livestock intensity. It indicates a negative relationship with age and family size. The leasing-out equation shows a positive relationship with the amount of land owned indicating that those who have more are likely to lease out. It shows a negative relationship with the number of crops and crop revenue indicating that those with greater cropping intensity and income are unlikely to lease out. Overall, the land holding size, the age, crop intensity/ diversification and crop revenues appear to be major determinants of the behaviour.

Labour Market

The labour-employment is another major determinant of income generation in the rural areas. One of the important features of employment is the occupational profile. Table-10 shows

Table-10: Occupation of Head of the Household	
<i>Occupation</i>	<i>Percentage</i>
Farming	36.7
Agricultural Labour	45.0
Service	5.8
Blacksmith	0.8
Carpenter	0.8
Mason	1.7
Diamond Work	0.8
Shopkeeper/Trader	2.5
Hair Cutting	0.8
Driver	2.5
Domestic Work	0.8
Vegetable Hawker	1.7

the occupational profile of the heads of households in the sample survey. There is a substantial diversity in the occupations observed, but the most important occupations are

clearly farming for 36.7 percent of the households, and agricultural labour for 45 percent of the households. These figures clearly indicate the massive dependence on agriculture in occupations and employment in the rural areas. Thus, agriculture is of paramount importance for rural employment. Table-11 reveals the diversity in the occupational profile across the districts of Banaskantha and Kheda as well as over the reform period for the entire population over 12 years of age covered in the survey. The table shows that over the reform period, the percentage of people showing no occupation has reduced considerably from about 18 percent to about 5 percent. This is indicative of increased employment opportunities. Whereas the number showing farming as their main occupation is only 20 percent in Kheda, as compared to 42 percent in Banaskantha, the number occupied as agricultural labour is much higher at 47 percent in Kheda, as compared to 26 percent in Banaskantha.

Table-11 Distribution on Main Occupation of Total Population above 12 years							
<i>(Percent)</i>							
<i>Sl. No</i>	<i>Occupation</i>	<i>Banaskantha</i>		<i>Kheda</i>		<i>Total</i>	
		<i>1990/91</i>	<i>1997/98</i>	<i>1990/91</i>	<i>1997/98</i>	<i>1990/91</i>	<i>1997/98</i>
0	Nil	18.3	4.6	17.3	4.5	17.8	4.5
1	Farming	36.1	42.3	21.0	20.2	28.5	31.2
2	Dairy	0	0	0	0	0	0
3	Agricultural Labour	21.9	26.1	37.9	47.3	31.4	36.8
4	Non-agri. Labour						
5	Leather work						
6	Weaving						
7	Hiring out camel cart						
8	Service	0.8	1.2	3.7	4.5	2.3	2.9
9	Migration as agri. Labour	0	1.7	0	0	0	0.8
10	Migration as non -agri. labour						
11	Retired	1.2	2.5	1.2	2.9	1.2	2.7
12	Tailoring	0	0		0.4		0.2
13	Blacksmith	0.4	0.4	0	0	0.2	0.2
14	Carpenter	0	0	0.4	0.4	0.2	0.2
15	Mason	0.4	0.8	0	0.4	0.2	0.6
16	Pottery						
17	Diamond work	0.8	0.8	0	0	0.4	0.4
18	Shopkeeper/trader	1.2	1.2	1.2	0.8	1.2	1.0
19	Hair cutting	0.4	0.4	0	0	0.2	0.2
20	Domestic servant						
21	Herder						
22	Driver	.04	0.8	0	0	0.2	0.4
23	Domestic work	5.8	6.2	5.8	9.9	5.8	8.1
24	Veg. Hawker	2.5	2.5	0	0	1.2	0
25	Part-time servant						
26	Drum beater						
27	Forest nursery						
28	Study	6.6	8.3	11.5	8.6	9.1	8.5
	Total	100.0	100.0	100.0	100.0	100.0	100.0

The number showing dependence on farming as well as agriculture labour has actually increased over the reform period, indicating continued importance of agriculture for employment. However, a large number of other occupations also reveal themselves in the survey.

Table-12 shows that households owning land and having irrigation and livestock show the highest number of days worked on own farm. But they also show a substantial amount of employment on other farms and in non-farm activities. The landless households show the highest employment on other farms, but the highest overall employment is shown by households with land, no irrigation and livestock. Correlation analysis reveals that there has been some shift in the occupational patterns over the reform period. It also shows that the total number of days worked by a household is most highly correlated with non-farm work, indicating that availability of non-farm work can add considerably to the total employment of the rural population. The analysis also shows that non-farm work is correlated with education and literacy, indicating that these play a significant role in enhancing non-farm work possibilities.

Table-12 : No. of Days Worked for the Entire Household				
<i>Group</i>	<i>Average No. of days worked by entire household</i>			
	<i>Own Farm</i>	<i>Other Farm</i>	<i>Non-farm</i>	<i>Total</i>
1. Land+Irrigation+Livestock	210.4	160.8	111.6	481.2
2. Land+Irrigation+No Livestock	115.7	161.8	32.2	309.8
3. Land +Unirrigated+Livestock	163.8	266.9	99.6	530.3
4.Land +Unirrigated+No Livestock	44.2	150.0	128.5	322.8
5. Landless/Very Marginal	30.0	282.0	140.7	452.1
6. Service Class	0.0	30.0	456.6	486.6
Overall	107.9	211.7	132.6	450.7
F-Stat	9.67	3.35	5.07	1.52
Significance Level	0.0	0.0	0.0	0.18
Correlation Between Selected Variables				
<i>Variable</i>	<i>Occupation 1997/98</i>	<i>Total No. Days Worked</i>	<i>Education</i>	<i>Literacy</i>
Occupation 1990/91	0.655**			
Own Farm Work		0.1666**	-0.0591	-0.0302
Other Farm Work		0.4836**	-0.1342*	-0.0513
Non-Farm Work		0.6829**	0.1939**	0.1247*
Total Work		1.0000	0.0466	0.0582
* At 0.01 significance level; ** At 0.001 significance level				

How frequently is migration resorted to by rural household for gaining employment? Table-13 shows that only 7.5 percent of the households and 2.35 percent of

the population shows migration. Thus, migration is not a major income generation strategy for the rural households surveyed, however, the table shows that it has increased substantially over the reform period with more than half the migrating households indicating that they did not migrate for work in 1990/91. Landless households are the most likely to engage in migration, but even some households, who have land, irrigation and livestock show migration. 70 percent of the migrants are male, and 30 percent are female. By occupation, agricultural labour is the most common employment purpose for migration. Most of the migration is within a 10 kms. Radius, and has a frequency of 2 to 3 times in a year. The period of migration is most commonly 90 to 120 days in a year, but in a few cases can be over 180 days in a year.

Table-14 shows the participation of house-holds in labour markets of different kinds. It shows that in dry Banaskantha, the most frequent kind of participation is in the farm labour markets, and ranges from 48 percent for male and 36 percent for female. In sub-humid Kheda, this percentage is even higher at 66 percent for male and 65 percent for female. However, participation in non-farm labour market is higher in Banaskantha at 23 percent for male and 15 percent for female. The participation in salary job market is relatively small, and the highest percentage is shown by males in Kheda district. Overall the participation comes out to be nearly the same at 73 to 75 percent for male, and 65 to 66 percent for female.

The number of days worked is much higher in Kheda district, coming to 312 days as compared to 205 days for male. This difference originate largely from greater farm labour employment in Kheda district which has more rainfall and irrigation as compared to Banaskantha district. The highest total number of days worked is shown by those working in service class salary job market, indicating the high degree of employment these opportunities provide. In terms of wage rates reported, the lowest wage rates are for farm labour, but there is no difference between the male and female wage. Non-farm labour work offers some what higher wages, but the highest wages are seen in salary jobs, particularly those which are outside the local areas.

Table-13: Migration Profile	
<i>Overall Migration</i>	
No. of Households showing migration	7.50 percent
No. of Persons migrating	2.35 percent
<i>Household Groupwise Migration</i>	<i>% to all migrating households</i>
Land+Irrigation+Livestock	17.6
Land+Irrigation+No Livestock	11.8
Land+Unirrigated+Livestock	11.8
Landless	58.8
Sex : Male	70.6
Female	29.4
Nature of Migration	
	<i>Percentage</i>
Distance	
Upto 10 kms.	94.1
Between 50-100	5.9
Occupation for which migrating	
Agricultural Labour	70.6
Non-agricultural Labour	5.9
Kadiakam (Mason)	11.8
Forest Nursery	11.8
Period of Migration	
Upto 60 days in a year	17.6
60-90 days in a year	5.9
90-120 days in a year	41.2
120-180 days in a year	23.5
More than 180 days in a year	11.8
Frequency of migration (No. of times per year)	
2 times in a year	41.2
3 times in a year	47.1
12 times in a year	11.8
Status of migration in 1990/91	
Yes	47.1
No	52.9

What household characteristics determine the extent (man-days) of employment that each household finds in own-farm labour, other-farm labour and non-farm labour? This is examined through the following model:

$$Z_i = f (x_9, x_{10}, x_{11}, x_{12}, x_4, x_6, x_7, x_8)$$

Where:

Z_i = (1) Own farm labour (2) Other farm labour (3) Non-farm labour.

x_9 = Total operated land

x_{10} = Total operated irrigated land

x_{11} = Total male family members

- x_{12} = Total female family members
 x_4 = Education
 x_6 = Number of crops (indicating cropping intensity and crop diversification)
 x_8 = Livestock revenue
 (see Appendix for details)

This is estimated through TOBIT regression analysis, and the results are given in Table-15. A TOBIT model is preferred because of the truncation at zero and a large number of zeros in the data for the dependent variables. The results indicate that own-farm employment is positively related to the number of crops and the livestock revenue. It is negatively related to education. Employment in other-farms is positively associated with the number of male as well as female members in the household. It is negatively related to irrigation in the household farm. Non-farm labour employment is positively related to education, number of male and female family members, and total operated area. It is negatively related to irrigation on the household farm.

Table-14: Percentage of Households Showing Labour Income from Different Sources, Av. Wage Rate & No. of Days Worked – Participation in the Labour Markets						
	<i>Percent Households Showing Labour Income</i>		<i>No. of Days Worked</i>		<i>Av. Wage Rate (Rs./Day)</i>	
	<i>Banas-kantha</i>	<i>Kheda</i>	<i>Banas-kantha</i>	<i>Kheda</i>	<i>Banas-kantha</i>	<i>Kheda</i>
Farm Labour						
1. Farm labour – local (Male)	48.33	66.67	121.03	212.63	30.52	29.88
2. Farm labour – local (Female)	36.67	65.00	151.89	175.13	30.31	30.13
3. Migrant/outside (Male)	6.67	3.33	150.00	150.00	32.00	35.00
4. Migrant/outside (Female)	6.67	0.00	180.00		32.00	
Non-farm Labour						
5. Local (Male)	23.33	15.00	193.57	162.78	45.36	36.33
6. Local (Female)	15.00	5.00	181.67	47.67	36.11	36.67
7. Migrant/outside (Male)	10.00	8.33	120.00	118.00	40.83	41.00
8. Migrant/outside (Female)	8.33	0.00	90.00		39.00	
Service/Salary						
9. Local (Male)	6.67	11.67	296.25	308.57	62.75	40.29
10. Local (Female)	1.67	3.33	300.00	225.00	136.00	105.00
11. Outside (Male)	3.33	5.00	300.00	340.00	140.00	150.00
12. Outside (Female)	0.00	1.67		370.00		30.00
All Labour						
13. Total Male	73.33	75.00	205.11	312.00	53.50	56.20
14. Total Female	65.00	66.67	204.23	193.83	45.74	38.13
15. Overall			177.62	222.38	43.09	41.37

Table-15 : TOBIT Regression Results for Labour

Table-15 : TOBIT Regression Results for Labour								
Variable	Own-farm Labour				Other-farm Labour			
	<i>Coeff.</i>	<i>t-Stat.</i>	<i>Signf.</i>	<i>Level</i>	<i>Coeff.</i>	<i>t-Stat.</i>	<i>Signf.</i>	<i>Level</i>
x9	4.8337	0.563	0.57370		21.317	1.038	0.29938	
x10	-0.38380	-0.043	0.96606		-65.532	-2.720	0.00653	***
x11	-6.9050	-1.051	0.29322		47.114	3.419	0.00063	***
x12	-2.9429	-0.398	0.69028		48.433	3.185	0.00145	***
x4	-19.450	-3.603	0.00031	***	-13.982	-1.346	0.17826	
x6	86.788	8.473	0.0000	***	-33.147	-1.193	0.23268	
x8	0.25852	2.138	0.03249	***	-0.34086	-0.121	0.90357	
Variable	Non-farm Labour							
	<i>Coeff.</i>	<i>t-Stat.</i>	<i>Signf.</i>	<i>Level</i>				
x9	47.064	2.827	0.00470	***				
x10	-53.233	-3.067	0.00216	***				
x11	53.356	4.756	0.0000	***				
x12	64.552	5.130	0.0000	***				
x4	25.188	3.141	0.00236	***				
x6	-13.690	-0.760	0.44743					
x8	0.10155	0.452	0.65118					
<i>Note:</i> Significance: *** at 99%; ** at 95%; and * at 90%. Variable definitions are at the end of the paper.								

Conclusions

The paper examines the rural land and labour markets in the context of economic liberalization in India. Land and labour are the two fundamental resources available to the rural people for income generation, other than capital. The access to land and to employment for labour become basic determinants of well-being for the rural households. This study examines the recent changes in land and labour markets over the reform period and the underlying linkages of these to different characteristics at the household level. The study is based on primary household data collected from a systematic sample of rural households in two different agro-climatic settings in the State of Gujarat, India. The study finds that land markets over the reform period are leading to less landlessness rather than more, and marginal and medium farm sizes rather than large. Lease markets are leading to operated land in more hands now. Land buying behaviour is related to less land, more education, greater crop diversification, and higher crop and livestock revenues. Leasing-in is also related to many of these variables and is showing great diversity in lease agreements involving outputs, inputs and rent. Labour employment is showing diversity of occupations but the primary dependence on agriculture is about 80 percent and has increased indicating high continuing importance of agriculture. There has been some change in the occupational structure and non-farm employment is associated with higher overall employment. Own-farm employment is strongly related to crop diversification and livestock activity, other

farm employment to number of male and female members and irrigation, and non-farm employment to education. Within the limits of the data and analysis, the study finds that liberalization does not show much adverse effect but rather some positive impact on land and labour markets.

Appendix : Variables Definitions	
x1	Land owned in acres in 1997-98 (1990/91 values used in land purchase/ sale equations)
x2	Irrigated land owned in acres in 1997-98 (1990/91 values used in land purchase/ sale equations)
x3	Total number of family members
x4	Education level coded from 1 to 7 of the head of the household
x5	Age in years of the head of the household
x6	Number of crops grown throughout the year
x7	Total crop revenue in rupees
x8	Total livestock revenue in rupees
x9	Total operated land in acres in 1997-98
x10	Total operated irrigated land in acres in 1997-98
x11	Total male family members
x12	Total female family members
y1	Increase in land holding between 1990-91 and 1997-98 in acres if latter greater, else zero
y2	Decrease in land holding between 1990-91 and 1997-98 in acres if former greater, else zero
y3	Difference between land operated and land owned if former greater, else zero
y4	Difference between land operated and land owned if latter greater, else zero
z1	Man-days worked on own farm
z2	Man-days worked on other's farms
z3	Man-days worked on non-farm activities

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